TruCluster Software Products

Hardware Configuration Technical Update for KZPBA-CB

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Operating System and Version:	Compaq's Tru64 UNIX Version 4.0D

This technical update describes how to configure the KZPBA-CB PCI UltraSCSI Differential Host Adapter in a TruCluster Software Products environment.

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About This Technical Update

This technical update provides important information about using the KZPBA-CB PCI UltraSCSI host adapter with the TruCluster ™ software products.

Audience

If you plan to use a KZPBA-CB PCI UltraSCSI host adapter in a TruCluster hardware configuration, read this addendum to the *Hardware Configuration* manual for your TruCluster product.

Organization

This technical update contains an introductory chapter, a chapter covering the use and configuration of the KZPBA-CB UltraSCSI host adapter in a TruCluster configuration, and a chapter covering the procedure to replace a KZPSA-BB with a KZPBA-CB in an operational cluster.

1

KZPBA-CB PCI UltraSCSI Host Adapter

This technical update to the TruCluster Software Products *Hardware Configuration* manual provides important information about support for the KZPBA-CB PCI UltraSCSI host adapter with TruCluster Available Server Software Version 1.5 and TruCluster Production Server Software Version 1.5.

1.1 KZPBA-CB General Overview

The KZPBA-CB UltraSCSI host adapter:

- Is a high-performance PCI option connecting the PCI-based host system to the devices on a 16-bit, ultrawide differential SCSI bus.
- Is installed in a PCI slot of the supported member system (see Section 1.2).
- Is a single-channel, ultrawide differential adapter.
- Operates at the following speeds:
  - 5 MB/sec narrow SCSI at slow speed
  - 10 MB/sec narrow SCSI at fast speed
  - 20 MB/sec wide differential SCSI
  - 40 MB/sec wide differential UltraSCSI

Note

Even though the KZPBA-CB is an UltraSCSI device, it has an HD68 connector.

1.2 KZPBA-CB System and Adapter Restrictions

The KPBA-CB UltraSCSI adapter is supported on Compaq's DIGITAL UNIX with the Version 1.5 TruCluster products with the following restrictions:

- Only 30 shared SCSI buses are supported with the TruCluster products.
- Each system supporting the KZPBA-CB UltraSCSI host adapter limits the number of adapters that may be installed. The maximum number of KZPBA-CB UltraSCSI host adapters supported with the TruCluster Available Server Software and TruCluster Production Server Software products follow:
  - AlphaServer 800: 2
  - AlphaServer 1000A and 1200: 4
  - AlphaServer 4000: 8; Only one KZPBA-CB is supported in IOD0 (PCI0).
  - AlphaServer 4100: 5; Only one KZPBA-CB is supported in IOD0 (PCI0).
  - AlphaServer 8x00: Thirty (30) shared buses using KZPBA-CB options are supported.

    The KZPBA-CB is supported on the DWLPB only, it is not supported on the DWLPA PCIA option.
- A maximum of four HSZ50 or HSZ70 RAID array controllers can be placed on a single KZPBA-CB UltraSCSI bus. Only two redundant pairs of array controllers are allowed on one SCSI bus.
- Support for the KZPBA-CB with the TruCluster software products requires Compaq's DIGITAL UNIX Version 4.0D and TruCluster Available Server Software Version 1.5 or TruCluster Production Server Software Version 1.5 and installation of the following operating system patch. The DIGITAL UNIX and TruCluster patches are included in one kit.
  - Compaq's DIGITAL UNIX V4.0D/TCR 1.5 Patch Kit 3: `DUV40DAS00003-19981208.tar` (or later)

  The patch may be obtained from the Software Patch (ECO) Access Web site by going to the following URL:

  `http://www.service.digital.com/patches/`
- The KZPBA-CB requires ISP 1020/1040 firmware Version 5.57, available with the system SRM console firmware on the Alpha Systems Firmware 5.3 Update CD.
- The maximum length of any SCSI bus segment is 25 meters, including the length of the SCSI bus cables and SCSI bus internal to the SCSI adapter, hub, or storage device.
- See the KZPBA-CB UltraSCSI Storage Adapter Module *Release Notes* (AA-R5XWD-TE) for more information and a list of supported disk devices.

2

Using a KZPBA-CB in a TruCluster Configuration

This chapter describes how to install a KZPBA-CB UltraSCSI host adapter and how to connect it to the shared storage in a TruCluster configuration.

2.1 KZPBA-CB Installation Overview

Review the KZPBA-CB restrictions in Section 1.2 before installing the SCSI adapter.

The qualification and use of the DS-DWZZH-series UltraSCSI hubs in TruCluster configurations allows the KZPBA-CB to be cabled into a cluster in two different ways:

- Preferred method with radial connection to a DWZZH UltraSCSI hub and internal termination: The KZPBA-CB internal termination resistor SIPs are not removed. The host adapters are connected directly to a DWZZH UltraSCSI hub port. There can be only one member system connected to a hub port.

  The use of a DWZZH UltraSCSI hub in a TruCluster configuration is preferred because it improves the reliability of the detection of cable faults.

- Old method with external termination: Shared SCSI bus termination is external to the KZPBA-CB. This is the old method used to connect a KZPBA-CB to the cluster; remove the adapter termination resistor SIPs and install a BN21W-0B Y cable and an H879-AA terminator for external termination. This allows the removal of a SCSI bus cable from the host adapter without affecting SCSI bus termination.

  This method may be used with or without a DWZZH UltraSCSI hub with the following restrictions:

  – You may use external termination and Y cables with a DWZZH-03 UltraSCSI hub to achieve a 4-member cluster configuration.

  – You may not use external termination and Y cables with a DWZZH-05 UltraSCSI hub.

The following sections describe how to install the KZPBA-CB host adapters and configure them into TruCluster configurations using both methods of

termination—the preferred method of radial connection with internal termination and the old method of external termination.

2.2 Installing a KZPBA-CB UltraSCSI Host Adapter

Use the preferred method of radial connection and internal termination only if you are using a DWZZH UltraSCSI hub, and if there is only one member system on the SCSI bus segment, and there is a direct connection to the hub port (no Y cable).

If you are installing a KZPBA-CB into a TruCluster configuration using the preferred method with radial connection and internal termination, see Section 2.2.1 and Table 2–1. See Section 2.2.8.1 for information on connecting the shared storage into this type of TruCluster configuration.

Use the old method with external termination to configure a KZPBA-CB into a TruCluster configuration if:

- You are not using a DWZZH UltraSCSI hub
- You are using a DWZZH UltraSCSI hub with more than one member system on a SCSI bus segment

If you are installing a KZPBA-CB into a TruCluster configuration using the old method with external termination, see Section 2.2.2 and Table 2–2. See Section 2.2.8.2 for information on connecting the shared storage into this type of TruCluster configuration.

2.2.1 Radial Installation of a KZPBA-CB Using Internal Termination

Use this method of cabling member systems and shared storage in a TruCluster configuration if you are using a DWZZH UltraSCSI hub, and if there is only one member system on each hub port. You must reserve at least one hub port for shared storage.

The DS-DWZZH-series UltraSCSI hubs are designed to allow more separation between member systems and shared storage. Using the UltraSCSI hub also improves the reliability of the detection of cable faults.

A side benefit is the ability to connect the member systems' SCSI adapter directly to a hub port without external termination. This simplifies the configuration by reducing the number of cable connections.

A DWZZH UltraSCSI hub is installed in a DS-BA356 storage shelf (which has the required 180-watt power supply). It only receives power and mechanical support from the DS-BA356. There is no SCSI bus continuity between the DWZZH and DS-BA356.

The DWZZH contains a differential to single-ended signal converter for each hub port. The single-ended sides are connected together to form an internal single-ended SCSI bus segment. Each differential SCSI bus port is terminated internal to the DWZZH with terminators that cannot be disabled or removed.

Power for the DWZZH termination (TERMPWR) is supplied by the host SCSI bus adapter on that SCSI bus segment. If the member system is powered down or the cable is removed from the KZPBA-CB or the hub port, the loss of TERMPWR disables the hub port without affecting the remaining hub ports or SCSI bus segments. This is similar to removing a Y cable when using external termination.

The other end of the SCSI bus segment is terminated by the KZPBA-CB onboard termination resistor SIPs.

Use the steps in Table 2–1 to set up the KZPBA-CB for a TruCluster configuration using radial connection to a DWZZH and internal KZPBA-CB termination.

Table 2–1: Installing the KZPBA-CB for Radial Connection to a DWZZH

Step	Action	Refer to:
1	Update the system SRM console firmware from the Alpha Systems Firmware 5.3 Update CD-ROM. This provides the ISP1020/1040 Version 5.57 firmware required by the KZPBA-CB.	Use the firmware update release notes (Section 2.2.3)
2	Ensure that the eight KZPBA-CB internal termination resistor SIPs, RM1 - RM8 are installed.	*KZPBA-CB PCI-to-Ultra SCSI Differential Host Adapter User's Guide*, Section 2.2.4, and Figure 2–1
3	Power down the system and Install a KZPBA-CB UltraSCSI host adapter in the PCI slot corresponding to the logical bus to be used for the shared SCSI bus. Ensure that the number of adapters are within limits for the system, and that the placement is acceptable.	Section 1.2 and *KZPBA-CB PCI-to-Ultra SCSI Differential Host Adapter User's Guide*
4	Install a BN38C cable between the KZPBA-CB UltraSCSI host adapter and a DWZZH port.	

Table 2–1: Installing the KZPBA-CB for Radial Connection to a DWZZH (cont.)

Step	Action	Refer to:
	Notes The maximum length of a SCSI bus segment is 25 meters, including the bus length internal to the adapter and storage devices. One end of the BN38C cable is 68-pin high density. The other end is 68-pin VHDCI. The DWZZH accepts the 68-pin VHDCI connector. The number of member systems in the cluster has to be one less than the number of DWZZH ports.	
5	Power up the system and use the `show config` and `show device` console commands to display the installed devices and information about the KZPBA-CBs on the AlphaServer systems. Look for `QLogic ISP1020` in the `show config` display and `isp` in the `show device` display.	Section 2.2.6 and Example 2–1 through Example 2–8
6	Use the `show pk*` (AlphaServer 4x00) or `show isp*` (AlphaServer 8x00) console commands to determine the KZPBA-CB SCSI bus ID, and then use the `set` console command to set the KZPBA-CB SCSI bus ID.[a] Ensure that the SCSI ID that you use is distinct from all other SCSI IDs on the same shared SCSI bus. If you do not remember the other SCSI IDs, or do not have them recorded, you must determine these SCSI IDs. **Note** You will have problems if you have two or more SCSI adapters at the same SCSI ID on any one SCSI bus. If you are using a DS-DWZZH-05, you cannot use SCSI ID 7 for a KZPBA-CB UltraSCSI adapter; SCSI ID 7 is reserved for DS-DWZZH-05 use.	Section 2.2.7 and Example 2–9 through Example 2–13
7	Repeat steps 1 through 6 for any other KZPBA-CBs to be installed on this shared SCSI bus on other member systems.	
8	Connect the member systems to the shared storage.	Section 2.2.8.1

[a]See Section 2.2.5 for information about KZPBA-CB firmware.

2.2.2 Installing a KZPBA-CB Using External Termination

Use the steps in Table 2–2 to set up the KZPBA-CB for any TruCluster configuration using the old method of external termination.

Note

You may use external termination and Y cables with a DWZZH-03 UltraSCSI hub to achieve a 4-member cluster configuration, but you may not use external termination and Y cables with a DWZZH-05 UltraSCSI hub.

Table 2–2: Installing the KZPBA-CB Using External Termination

Step	Action	Refer to:
1	Update the system SRM console firmware from the Alpha Systems Firmware 5.3 Update CD-ROM. This provides the ISP1020/1040 Version 5.57 firmware required by the KZPBA-CB.	Use the firmware update release notes (Section 2.2.3)
2	Remove the eight KZPBA-CB internal termination resistor SIPs, RM1 - RM8.	*KZPBA-CB PCI-to-Ultra SCSI Differential Host Adapter User's Guide*, Section 2.2.4, and Figure 2–1
3	Power down the member system and install a KZPBA-CB UltraSCSI host adapter in the PCI slot corresponding to the logical bus to be used for the shared SCSI bus. Ensure that the number of adapters are within limits for the system, and that the placement is acceptable.	Section 1.2 and *KZPBA-CB PCI-to-Ultra SCSI Differential Host Adapter User's Guide*
4	Install a BN21W-0B Y cable on each KZPBA-CB UltraSCSI host adapter.	
5	Install an H879-AA terminator on one leg of the BN21W-0B Y cable of the member system that will be on the end of the shared SCSI bus.[a]	
6	Use the `show config` and `show device` console commands to display the installed devices and information about the KZPBA-CBs on the AlphaServer systems. Look for `QLogic ISP1020` in the `show config` display and `isp` in the `show device` display.[b]	Section 2.2.6 and Example 2–2 through Example 2–8
7	Use the `show pk*` (AlphaServer 800, 1000A, 1200, or 4x00) or `show isp*` (AlphaServer 8x00) console commands to determine the KZPBA-CB SCSI bus ID, and then use the `set` console command to set the KZPBA-CB SCSI bus ID.[c]	Section 2.2.7 and Example 2–9 through Example 2–13

Table 2–2: Installing the KZPBA-CB Using External Termination (cont.)

Step	Action	Refer to:
	Ensure that the SCSI ID that you use is distinct from all other SCSI IDs on the same shared SCSI bus. If you do not remember the other SCSI IDs, or do not have them recorded, you must determine these SCSI IDs. **Note** You will have problems if you have two or more SCSI adapters at the same SCSI ID on any one SCSI bus.	
8	Repeat steps 2 through 7 for any other KZPBA-CBs to be installed on this shared SCSI bus on other member systems.	
9	Connect the member systems to the shared storage.	Section 2.2.8

[a]When mixing HD68 and VHDCI cables, it is easier to place the member systems together on the end of the SCSI bus. This discussion assumes such a configuration. Plan accordingly if you wish to cable the cluster otherwise.
[b]The KZPBA-CB UltraSCSI host adapter is displayed as a QLogic 1020 device by the `show config` and `show dev` console commands on many AlphaServer systems. The KZPBA-CB host adapters are displayed as QLogic ISP1040B/V2 devices during a boot sequence or in the error log.
[c]See Section 2.2.5 for information about KZPBA-CB firmware.

2.2.3 Obtaining the Firmware Release Notes

You may be required to update the system or SCSI controller firmware during an Available Server or Production Server installation, so you may need the firmware release notes. Obtain the firmware release notes from the current Alpha Systems Firmware Update CD-ROM.

Note

To obtain the firmware release notes from the Firmware Update Utility CD-ROM, your kernel must be configured for the ISO 9660 Compact Disk File System (CDFS).

To obtain the release notes for the firmware update:

1. At the console prompt, or using the system startup log if the DIGITAL UNIX operating system is running, determine the drive number of the CD-ROM.
2. Boot the DIGITAL UNIX operating system if it is not already running.
3. Log in as root.

4. Place the Alpha Systems Firmware Update CD-ROM applicable to the DIGITAL UNIX version installed (or to be installed) into the drive.
5. Mount the CD-ROM as follows (`/dev/rz4c` is used as an example CD-ROM drive):

   # **mount -rt cdfs -o noversion /dev/rz4c/mnt**
6. Copy the appropriate release notes to your system disk. In this example, obtain the firmware release notes for the AlphaServer 4000/4100 from the Alpha Firmware Update 5.3 CD-ROM:

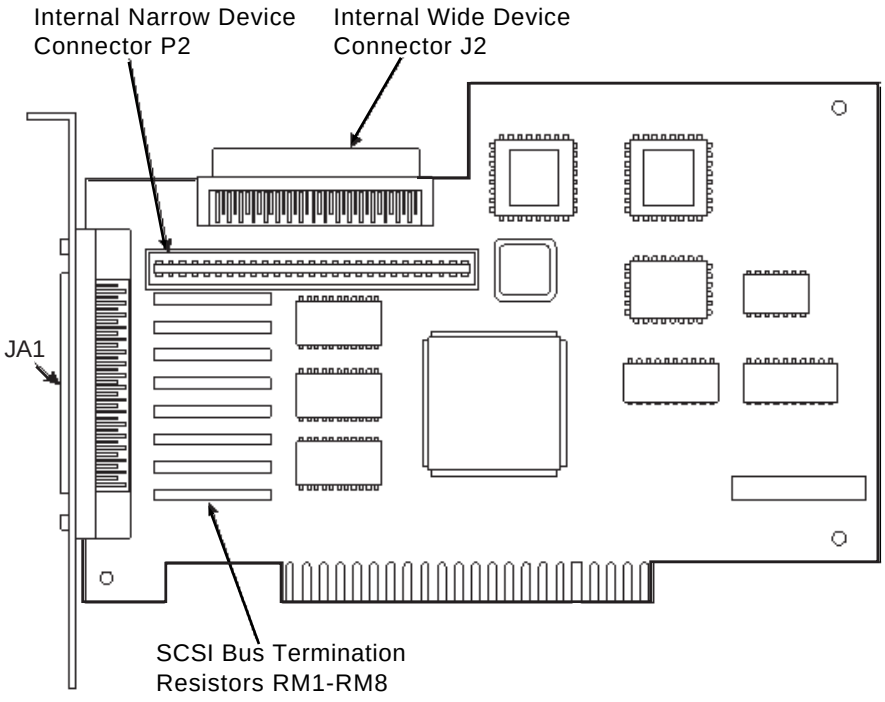
   # **cp /mnt/doc/alpha4100_v53_fw_relnote.txt as4100-rel-notes**
7. Unmount the CD-ROM drive:

   # **umount /mnt**
8. Print the release notes.

2.2.4 KZPBA-CB Termination Resistors

The KZPBA-CB internal termination is disabled by removing the termination resistors RM1 - RM8 as shown in Figure 2–1.

Figure 2–1: KZPBA-CB Termination Resistors



2.2.5 KZPBA-CB Firmware

The SRM console firmware includes the ISP1020/1040-based PCI option firmware, which includes the KZPBA-CB. When you update the SRM console firmware, you are enabling the KZPBA-CB firmware to be updated. When you turn on the power and reset the system, the SRM console loads KZPBA-CB adapter firmware from the console system flash ROM into RAM for all QLogic ISP1020/1040-based PCI options, including the KZPBA-CB UltraSCSI host adapter.

2.2.6 Displaying KZPBA-CB Adapters with the show Console Commands

Use the `show config` and `show device` console commands to display system configuration. Use the output to determine which devices are KZPBA-CBs, and to determine their SCSI bus IDs.

Example 2–1 shows the output from the `show config` console command entered on an AlphaServer 800.

Example 2–1: Displaying AlphaServer 800 Hardware Configuration

```
P00
>>>show config
                  Digital Equipment Corporation
                      AlphaServer 800 5/500

Firmware
SRM Console:    T5.3-70
ARC Console:    v5.66
PALcode:        VMS PALcode V1.20-3, OSF PALcode V1.22-5
Serial Rom:     V1.2

Processor
DECchip (tm) 21164A-2   500MHz

System
Motherboard Revision: 54-24803-02 Rev A

Memory
 512 Meg of System Memory
 Bank 0 = 512 Mbytes(128 MB Per DIMM) Starting at 0x00000000
 Bank 1 = No Memory Detected

Slot  Option             Hose 0, Bus 0, PCI
  5   QLogic ISP1020     pka0.7.0.5.0       SCSI Bus ID 7
                         dka100.1.0.5.0     RZ1CB-CA
                         dka400.4.0.5.0     RRD46
```

Example 2–1: Displaying AlphaServer 800 Hardware Configuration (cont.)

```
  6   S3 Trio64/Trio32
  7   Intel 82375                          Bridge to Bus 1, EISA
 11   DECchip 21041-AA   ewa0.0.0.11.0     00-00-F8-1A-38-A3
 12   DEC PCI MC                           Rev: e, mca0
 13   QLogic ISP1020     pkb0.4.0.13.0     SCSI Bus ID 7
                         dkb200.2.0.13.0   HSZ22
                         dkb201.2.0.13.0   HSZ22
                         dkb202.2.0.13.0   HSZ22
                         dkb300.3.0.13.0   HSZ22
                         dkb301.3.0.13.0   HSZ22
                         dkb302.3.0.13.0   HSZ22
P00>>>
```

Example 2–2 shows the output from the `show config` console command entered on an AlphaServer 1200.

Example 2–2: Displaying AlphaServer 1200 Hardware Configuration

```
P00 >>>show configuration
                  Digital Equipment Corporation
                        AlphaServer 1200

Console I5.5-7  OpenVMS PALcode V1.19-
16, Digital UNIX PALcode V1.21-24

Module                          Type     Rev    Name
System Motherboard              0        0000   mthrbrd0
Memory  256 MB DIMM             0        0000   mem0
Memory  256 MB DIMM             0        0000   mem1
CPU (4MB Cache)                 3        0003   cpu0
CPU (4MB Cache)                 3        0001   cpu1
Bridge (IOD0/IOD1)              600      0032   iod0/iod1
PCI Motherboard                 a        0004   saddle0

Bus 0  iod0 (PCI0)
Slot   Option Name              Type     Rev    Name
1      PCEB                     4828086  0015   pceb0
2      S3 Trio64/Trio32         88115333 0054   vga0
3      DECchip 21041-AA         141011   0021   tulip0
4      QLogic ISP1020           10201077 0005   isp1

Bus 1  pceb0 (EISA Bridge connected to iod0, slot 1)
Slot   Option Name              Type     Rev    Name

Bus 0  iod1 (PCI1)
```

Example 2–2: Displaying AlphaServer 1200 Hardware Configuration (cont.)

```
Slot   Option Name              Type     Rev    Name
1      NCR 53C810               11000    0002   ncr0
2      QLogic ISP1020           10201077 0005   isp0
4      DEC PCI MC               181011   000E   mc0
P00>>>
```

Example 2–3 shows the output from the `show config` console command on an AlphaServer 4100 system.

Example 2–3: Displaying Configuration on an AlphaServer 4100

```
P00>>> show config
                    Digital Equipment Corporation
                           AlphaServer 4x00

Console V5.1-3  OpenVMS PALcode V1.19-
14, Digital UNIX PALcode V1.21-22

Module                          Type     Rev    Name
System Motherboard              0        0000   mthrbrd0
Memory   64 MB SYNC             0        0000   mem0
Memory   64 MB SYNC             0        0000   mem1
Memory   64 MB SYNC             0        0000   mem2
Memory   64 MB SYNC             0        0000   mem3
CPU (4MB Cache)                 3        0000   cpu0
CPU (4MB Cache)                 3        0000   cpu1
Bridge (IOD0/IOD1)              600      0021   iod0/iod1
PCI Motherboard                 8        0000   saddle0

Bus 0  iod0 (PCI0)
Slot   Option Name              Type     Rev    Name
1      PCEB                     4828086  0005   pceb0
2      S3 Trio64/Trio32         88115333 0000   vga0
3      DECchip 21040-AA         21011    0024   tulip0
4      DEC KZPSA                81011    0000   pks1
5      DEC PCI MC               181011   000B   mc0

Bus 1  pceb0 (EISA Bridge connected to iod0, slot 1)
Slot   Option Name              Type     Rev    Name

Bus 0  iod1 (PCI1)
Slot   Option Name              Type     Rev    Name
1      NCR 53C810               11000    0002   ncr0
2      NCR 53C810               11000    0002   ncr1
3      QLogic ISP1020           10201077 0005   isp0
```

Example 2–3: Displaying Configuration on an AlphaServer 4100 (cont.)

```
4       QLogic ISP1020           10201077 0005   isp1
5       DEC KZPSA                81011    0000   pks0
```

Example 2–4 shows the output from the `show config` console command entered on an AlphaServer 8200 system.

Example 2–4: Displaying Configuration on an AlphaServer 8200

```
>>> show config
        Name             Type    Rev    Mnemonic
TLSB
 4++    KN7CC-AB         8014    0000    kn7cc-ab0
 5+     MS7CC            5000    0000    ms7cc0
 8+     KFTIA            2020    0000    kftia0

 C0  Internal PCI connected to kftia0   pci0
 0+  QLogic ISP1020 10201077    0001    isp0
 1+  QLogic ISP1020 10201077    0001    isp1
 2+  DECchip 21040-AA  21011    0023  tulip0
 4+  QLogic ISP1020 10201077    0001    isp2
 5+  QLogic ISP1020 10201077    0001    isp3
 6+  DECchip 21040-AA  21011    0023  tulip1

 C1  PCI connected to kftia0
 0+  KZPAA              11000    0001  kzpaa0
 1+  QLogic ISP1020 10201077    0005    isp4
 2+  KZPSA              81011    0000  kzpsa0
 3+  KZPSA              81011    0000  kzpsa1
 4+  KZPSA              81011    0000  kzpsa2
 7+  DEC PCI MC        181011    000B     mc0
```

Example 2–5 shows the output from the `show device` console command entered on an AlphaServer 800.

Example 2–5: Displaying Devices on an AlphaServer 800

```
P00 >>>show device
dka100.1.0.5.0          DKA100                  RZ1CB-CA  LYJ0
dka400.4.0.5.0          DKA400                     RRD46  1337
dkb200.2.0.13.0         DKB200                     HSZ22  D11O
dkb201.2.0.13.0         DKB201                     HSZ22  D11O
dkb202.2.0.13.0         DKB202                     HSZ22  D11O
dkb300.3.0.13.0         DKB300                     HSZ22  D11O
```

Example 2–5: Displaying Devices on an AlphaServer 800 (cont.)

```
dkb301.3.0.13.0        DKB301                    HSZ22  D11O
dkb302.3.0.13.0        DKB302                    HSZ22  D11O
dva0.0.0.1000.0        DVA0
ewa0.0.0.11.0          EWA0                00-00-F8-1A-38-A3
pka0.7.0.5.0           PKA0              SCSI Bus ID 7  5.57
pkb0.4.0.13.0          PKB0              SCSI Bus ID 7  5.57
P00>>>
```

Example 2–6 shows the output from the `show device` console command entered on an AlphaServer 1200.

Example 2–6: Displaying Devices on an AlphaServer 1200

```
P00 >>>show device
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI,
hose 1  SCSI Bus ID 7
dka500.5.0.1.1     DKa500                   RRD46  1337
polling isp0 (QLogic ISP1020) slot 2,
 bus 0 PCI, hose 1  SCSI Bus ID 7
dkb200.2.0.2.1     DKb200                   HSZ22  D11O
dkb201.2.0.2.1     DKb201                   HSZ22  D11O
dkb202.2.0.2.1     DKb202                   HSZ22  D11O
dkb300.3.0.2.1     DKb300                   HSZ22  D11O
dkb301.3.0.2.1     DKb301                   HSZ22  D11O
dkb302.3.0.2.1     DKb302                   HSZ22  D11O
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0    DVA0                      RX23
polling isp1 (QLogic ISP1020) slot 4, bus 0 PCI,
hose 0   SCSI Bus ID 7
dkc100.1.0.4.0     DKc100                   RZ28D  0010
polling tulip0 (DECchip 21041-AA) slot 3, bus 0 PCI, hose 0
ewa0.0.0.3.0       00-00-F8-1A-2C-74    BNC
P00>>>
```

Example 2–7 shows the output from the `show device` console command entered on an AlphaServer 4100 system.

Example 2–7: Displaying Devices on an AlphaServer 4100

```
P00>>> show device
polling ncr0 (NCR 53C810) slot 1, bus0 PCI, hose 1 SCSI Bus ID 7
dka500.5.0.1.1    Dka500             RRD45    1645
polling ncr1 (NCR 53C810) slot 2, bus0 PCI, hose 1 SCSI Bus ID 7
dkb0.0.0.2.1      DKb0               RZ29B    0007
```

Example 2–7: Displaying Devices on an AlphaServer 4100 (cont.)

```
dkb100.1.0.2.1    DKb100             RZ29B    0007
polling isp0 (QLogic ISP1020) slot 3, bus 0 PCI, hose 1  SCSI Bus ID 7
dkc0.0.0.3.1      DKc0               HSZ70    V70Z
dkc1.0.0.3.1      DKc1               HSZ70    V70Z
dkc2.0.0.3.1      DKc2               HSZ70    V70Z
dkc3.0.0.3.1      DKc3               HSZ70    V70Z
dkc4.4.0.3.1      DKc4               HSZ70    V70Z
dkc5.0.0.3.1      DKc5               HSZ70    V70Z
dkc6.0.0.3.1      DKc6               HSZ70    V70Z
dkc100.1.0.3.1    DKc100             RZ28M    0568
dkc200.2.0.3.1    DKc200             RZ28M    0568
dkc300.3.0.3.1    DKc300             RZ28     442D
polling isp1 (QLogic ISP1020) slot 4, bus 0 PCI, hose 1  SCSI Bus ID 7
dkd0.0.0.4.1      DKd0               HSZ50-AX X29Z
dkd1.0.0.4.1      DKd1               HSZ50-AX X29Z
dkd2.0.0.4.1      DKd2               HSZ50-AX X29Z
dkd100.1.0.4.1    DKd100             RZ26N    0568
dkd200.1.0.4.1    DKd200             RZ26     392A
dkd300.1.0.4.1    DKd300             RZ26N    0568
polling kzpsa0 (DEC KZPSA) slot 5, bus 0 PCI, hose 1  TPwr 1 Fast 1 Bus ID 7
kzpsa0.7.0.5.1    dke TPwr 1 Fast 1 Bus ID 7 L01 A11
dke100.1.0.5.1    DKe100             RZ28     442D
dke200.2.0.5.1    DKe200             RZ26     392A
dke300.3.0.5.1    DKe300            RZ26L     442D
polling floppy0 (FLOPPY) pceb IBUS hose 0
dva0.0.0.1000.0   DVA0               RX23
polling kzpsa1 (DEC KZPSA) slot 4, bus 0 PCI, hose 0  TPwr 1 Fast 1 Bus ID 7
kzpsa1.7.0.4.1    dkf TPwr 1 Fast 1 Bus ID 7 E01 A11
dkf100.1.0.5.1    DKf100             RZ26     392A
dkf200.2.0.5.1    DKf200             RZ28     442D
dkf300.3.0.5.1    DKf300             RZ26     392A
polling tulip0    (DECchip 21040-AA) slot 3, bus 0 PCI, hose 0
ewa0.0.0.3.0      00-00-F8-21-0B-56  Twisted-Pair
```

Example 2–8 shows the output from the `show device` console command entered on an AlphaServer 8200 system.

Example 2–8: Displaying Devices on an AlphaServer 8200

```
>>> show device
polling for units on isp0, slot0, bus0, hose0...
polling for units on isp1, slot1, bus0, hose0...
polling for units on isp2, slot4, bus0, hose0...
polling for units on isp3, slot5, bus0, hose0...
polling for units kzpaa0, slot0, bus0, hose1...
pke0.7.0.0.1      kzpaa4        SCSI Bus ID 7
dke0.0.0.0.1      DKE0               RZ28    442D
dke200.2.0.0.1    DKE200             RZ28    442D
dke400.4.0.0.1    DKE400             RRD43   0064

polling for units isp4, slot1, bus0, hose1...
dkf0.0.0.1.1      DKF0               HSZ70    V70Z
```

Example 2–8: Displaying Devices on an AlphaServer 8200 (cont.)

```
dkf1.0.0.1.1      DKF1              HSZ70    V70Z
dkf2.0.0.1.1      DKF2              HSZ70    V70Z
dkf3.0.0.1.1      DKF3              HSZ70    V70Z
dkf4.0.0.1.1      DKF4              HSZ70    V70Z
dkf5.0.0.1.1      DKF5              HSZ70    V70Z
dkf6.0.0.1.1      DKF6              HSZ70    V70Z
dkf100.1.0.1.1    DKF100            RZ28M    0568
dkf200.2.0.1.1    DKF200            RZ28M    0568
dkf300.3.0.1.1    DKF300            RZ28     442D

polling for units on kzpsa0, slot 2, bus 0, hose1...
kzpsa0.4.0.2.1    dkg     TPwr 1 Fast 1 Bus ID 7   L01 A11
dkg0.0.0.2.1      DKG0              HSZ50-AX X29Z
dkg1.0.0.2.1      DKG1              HSZ50-AX X29Z
dkg2.0.0.2.1      DKG2              HSZ50-AX X29Z
dkg100.1.0.2.1    DKG100            RZ26N    0568
dkg200.2.0.2.1    DKG200            RZ28     392A
dkg300.3.0.2.1    DKG300            RZ26N    0568

polling for units on kzpsa1, slot 3, bus 0, hose1...
kzpsa1.4.0.3.1    dkh     TPwr 1 Fast 1 Bus ID 7   L01 A11
dkh100.1.0.3.1    DKH100            RZ28     442D
dkh200.2.0.3.1    DKH200            RZ26     392A
dkh300.3.0.3.1    DKH300           RZ26L     442D

polling for units on kzpsa2, slot 4, bus 0, hose1...
kzpsa2.4.0.4.1    dki     TPwr 1 Fast 1 Bus ID 7   L01 A10
dki100.1.0.3.1    DKI100            RZ26     392A
dki200.2.0.3.1    DKI200            RZ28     442C
dki300.3.0.3.1    DKI300            RZ26     392A
```

2.2.7 Displaying pk* Console Environment Variables and Setting the KZPBA-CB SCSI ID

The following sections show how to use the show console command to display the pk* console environment variables and set the KZPBA-CB SCSI ID on various AlphaServer systems. Use these examples as guides for your system.

Note that the console environment variables used for the SCSI options vary from system to system. Also, a class of environment variables (for example, pk*) may show both internal and external options.

Compare the following examples with the devices shown in the show config and show dev examples to determine which devices are KZPBA-CBs on the shared SCSI bus.

2.2.7.1 Displaying KZPBA-CB pk* Console Environment Variables

To determine the console environment variables to use, execute the show pk* console command. The show pk* command displays all console environment variables for the KZPBA-CB modules, and also shows the console variables for the NCR53C810 chips and the ISP1020 chips on a KFTIA.

Example 2–9 shows the pk console environment variables for an AlphaServer 800.

Example 2–9: Displaying the pk* Console Environment Variables on an AlphaServer 800 System

```
P00>>>show pk*
pka0_host_id            7
pka0_soft_term          on
pkb0_host_id            7
pkb0_soft_term          diff
```

Example 2–9 shows two pk devices. Example 2–1 shows two QLogic ISP1020 devices. The first (pka0) is for the internal SCSI bus and is connected to the CD-ROM and boot disk. It is a QLogic ISP1020 device. The second (pkb0) is the KZPBA-CB (QLogic ISP1040) for the shared SCSI bus. Note that in Example 2–1, pkb0 is connected to an HSZ22. During a normal installation, the HSZ22 will not show up in the console output as the KZPBA-CB and the cluster installation would not be complete yet.

Example 2–9 shows two pk*0_soft_term environment variables:

- pka0_soft_term for the QLogic ISP1020 device is on
- pkb0_soft_term for the KZPBA-CB is diff

The pk*0_soft_term environment variable applies to systems using the QLogic ISP1020 SCSI controller, which implements the 16-bit wide SCSI bus and uses dynamic termination.

The QLogic ISP1020 module has two terminators, one for the 8 low bits and one for the high 8 bits. There are five possible values for pk*0_soft_term:

- off—Turns off both low 8 bits and high 8 bits
- low—Turns on low 8 bits and turns off high 8 bits

- high—Turns on high 8 bits and turns off low 8 bits
- on—Turns on both low 8 bits and high 8 bits
- diff—Places the bus in differential mode

As the KZPBA-CB (ISP1040) termination is determined by the presence or absence of internal temination resistor SIPS RM1 - RM8, the pkb0_soft_term environment variable has no meaning, therefore, it may be ignored.

Also, note that in Example 2–9 both SCSI IDs are set to 7 as shown by pka0_host_id and pkb0_host_id.

Example 2–10 shows the pk console environment variables for an AlphaServer 1200.

Example 2–10: Displaying the pk* Console Environment Variables on an AlphaServer 1200 System

```
P00>>>show pk*
pka0_disconnect         1
pka0_fast               1
pka0_host_id            7

pkb0_host_id            7
pkb0_soft_term          diff

pkc0_host_id            7
pkc0_soft_term          on
```

In Example 2–10 we see three pk devices. However, Example 2–2 only shows two QLogic ISP1020 devices. In this case, we need to look at the show dev command output in Example 2–6. Here we see that ncr0 (NCR 53C810 chip) is attached to the CD-ROM (pka0). The second QLogic ISP1020 device, isp1, is connected to the boot disk, DKc100 (pkc0). That means that isp0 (pkb0) is the KZPBA-CB on this system.

Example 2–11 shows the pk console environment variables for an AlphaServer 4100.

Example 2–11: Displaying the pk* Console Environment Variables on an AlphaServer 4100 System

```
P00>>>show pk*
pka0_disconnect         1
pka0_fast               1
pka0_host_id            7
```

Example 2–11: Displaying the pk* Console Environment Variables on an AlphaServer 4100 System (cont.)

```
pkb0_disconnect         1
pkb0_fast               1
pkb0_host_id            7

pkc0_host_id            7
pkc0_soft_term          diff

pkd0_host_id            7
pkd0_soft_term          on

pke0_fast               1
pke0_host_id            7
pke0_termpwr            1

pkf0_fast               1
pkf0_host_id            7
pkf0_termpwr            1
```

Comparing the `show pk*` command display in Example 2–11 with the `show config` command in Example 2–3, you determine that the first two devices are for `ncr0` and `ncr1` (`pka` and `pkb`). The next two devices (`pkc` and `pkd`) are for the KZPBA-CBs, `isp0` and `isp1`. The last two devices (`pke` and `pkf`) are for KZPSA-BBs, `pks0` and `pks1`.

Example 2–12 shows the use of the `show isp` console command to display the console environment variables for KZPBA-CBs on an AlphaServer 8x00.

Example 2–12: Displaying Console Variables for a KZPBA-CB on an AlphaServer 8x00 System

```
P00>>> show isp*
isp0_host_id      7
isp0_soft_term    on

isp1_host_id      7
isp1_soft_term    on

isp2_host_id      7
isp2_soft_term    on

isp3_host_id      7
isp3_soft_term    on
```

Example 2–12: Displaying Console Variables for a KZPBA-CB on an AlphaServer 8x00 System (cont.)

```
isp5_host_id      7
isp5_soft_term    diff
```

Both Example 2–4 and Example 2–8 show five `isp` devices; `isp0`, `isp1`, `isp2`, `isp3`, and `isp4`. In Example 2–12, the `show isp*` console command shows `isp0`, `isp1`, `isp2`, `isp3`, and `isp5`.

The console code that assigns console environment variables counts every I/O adapter including the KZPAA, which is the device after `isp3`, and therefore logically `isp4` in the numbering scheme. The `show isp` console command skips over `isp4` because the KZPAA is not a QLogic 1020/1040 class module.

Example 2–4 and Example 2–8 show that `isp0`, `isp1`, `isp2`, and `isp3` are on the internal KFTIA PCI bus and not on a shared SCSI bus. Only `isp5`, the KZPBA-CB, is on a shared SCSI bus. The other three shared SCSI buses use KZPSA-BBs.

2.2.7.2 Setting the KZPBA-CB SCSI ID

After you determine the console environment variables for the KZPBA-CBs on the shared SCSI bus, use the `set` console command to set the SCSI ID. For a TruCluster configuration, you will most likely have to set the SCSI ID for all KZPBA-CB UltraSCSI adapters except one. And, if you are using a DS-DWZZH-05, you will have to set the SCSI IDs for all KZPBA-CB UltraSCSI adapters.

Note

You will have problems if you have two or more SCSI adapters at the same SCSI ID on any one SCSI bus.

If you are using a DS-DWZZH-05, you cannot use SCSI ID 7 for a KZPBA-CB UltraSCSI adapter; SCSI ID 7 is reserved for DS-DWZZH-05 use.

Assume that the KZPBA-CBs shown in Example 2–9 through Example 2–12 are all to be in a cluster and on the same shared SCSI bus with a DS-DWZZH-05. In this case, each of the SCSI IDs has to be changed.

Use the set console command as shown in Example 2–13 to set the SCSI ID. In this example, the SCSI ID is set for KZPBA-CB pkc on the AlphaServer 4100 shown in Example 2–11.

Example 2–13: Setting the SCSI Bus ID

```
P00>>> show pkc0_host_id
7
P00>>> set pkc0_host_id 6
P00>>> show pkc0_host_id
6
```

2.2.8 Connecting KZPBA-CBs to Shared Storage

After you complete the steps in Table 2–2 and have the KZPBA-CB installed and the correct SCSI ID set, the next step is to connect the member system to the shared storage.

The following sections discuss how to connect member systems with KZPBA-CB host adapters to shared storage. Section 2.2.8.1 covers the preferred method of radial connection and internal termination using a DS-DWZZH-03 or DS-DWZZH-05 UltraSCSI hub. Section 2.2.8.2 covers connecting an externally terminated KZPBA-CB to shared storage. Note that if you want to configure a four-member system cluster with a DS-DWZZH-03 UltraSCSI hub, the KZPBA-CBs need to be terminated externally. Configurations of this type are covered in Section 2.2.8.2.

2.2.8.1 Radially Connecting Member Systems to Shared Storage using a DWZZH UltraSCSI Hub

The following sections discuss how to configure cluster systems using radial connection of the KZPBA-CB host adapters and the HSZ50 and HSZ70 RAID array controllers to a DS-DWZZH-03 or DS-DWZZH-05 UltraSCSI hub.

Notes

The only RAID array controllers supported for use with the KZPBA-CB are the HSZ50 and HSZ70.

A cluster configuration using radial connection to a DWZZH UltraSCSI hub is limited to one member system less than the number of hub ports. A radial configuration with a

DS-DWZZH-03 is limited to two member systems; a radial configuration with a DS-DWZZH-05 is limited to four member systems.

2.2.8.1.1 Connecting an HSZ50 to a DS-DWZZH-03 or DS-DWZZH-05 in a Radial Configuration

To prepare the shared storage SCSI bus segment using HSZ50 RAID array controllers radially connected to a DS-DWZZH-03 or DS-DWZZH-05 UltraSCSI hub, follow these steps while referring to Figure 2–2 or Figure 2–3 and Table 2–3:

1. Attach an H885-AA trilink connector to each HSZ50 controller on the SCSI bus segment.
2. Attach an H879-AA terminator to the H885-AA trilink connector on the HSZ50 controller that will be on the end of the SCSI bus segment.
3. If there are two HSZ50 controllers, connect the two H885-AA trilinks on the controllers with a BN21K (or BN21L) cable.
4. Connect the DS-DWZZH-03 or DS-DWZZH-05 UltraSCSI hub to the open H885-AA connector on the HSZ50 with a BN38C cable. The length of the SCSI bus segment must not exceed 25 meters.

Note

One end of the BN38C cable is 68-pin high density. The other end is 68-pin VHDCI. The DS-DWZZH-03 and DS-DWZZH-05 accepts the 68-pin VHDCI connector.

Figure 2–2: Radially Connected TruCluster Configuration Using Two Member Systems with KZPBA-CBs, a DS-DWZZH-03, and an HSZ50

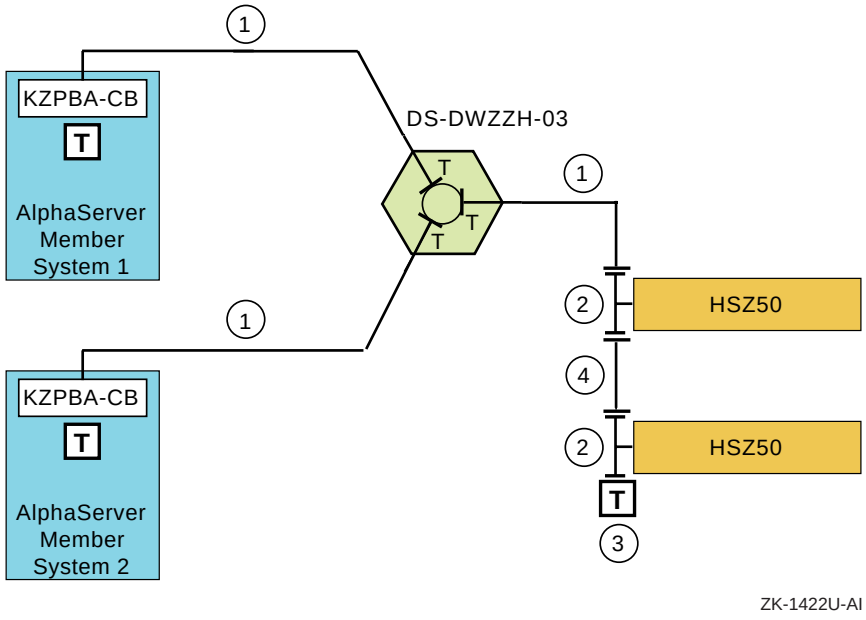


Figure 2–3: Radially Connected TruCluster Configuration Using Four Member Systems with KZPBA-CBs, a DS-DWZZH-05, and an HSZ50

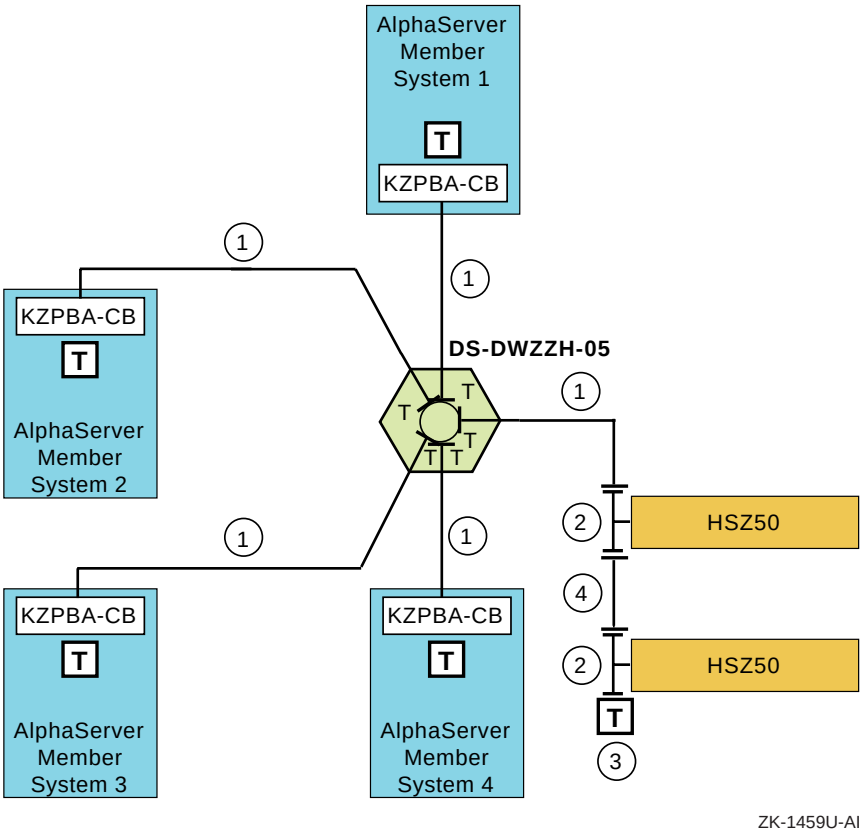


Table 2–3 shows the components used to create the cluster shown in Figure 2–2 and Figure 2–3.

Table 2–3: Hardware Components Used in the Configuration Shown in Figures 2-2 and 2-3

Callout Number	Description
1	BN38C cable[a] [b]
2	H885-AA HD68 trilink connector
3	H879-AA HD68 terminator
4	BN21K or BN21L cable[b]

[a]The maximum length of the SCSI bus segment, including the BN38C cable and internal length of the devices, is 25 meters.
[b]The maximum combined length of the SCSI bus segment, including the BN38C and BN21K (or BN21L) cables and internal length of the devices, is 25 meters.

2.2.8.1.2 Connecting an HSZ70 to a DS-DWZZH-03 Radial Configuration

To prepare the shared storage SCSI bus segment using HSZ70 RAID array controllers radially connected to a DS-DWZZH-03 or DS-DWZZH-05 UltraSCSI hub, follow these steps while referring to Figure 2–4 or Figure 2–5 and Table 2–4:

1. Install an H8861-AA trilink connector on each HSZ70 controller port on the SCSI bus segment.
2. Attach an H8863-AA terminator to the H8861-AA connector on the HSZ70 controller that will be on the end of the SCSI bus segment.
3. If there are two HSZ70 controllers, connect the two H8861-AA trilink connectors on the controllers with a BN37A cable.
4. Connect the DS-DWZZH-03 or DS-DWZZH-05 to the HSZ70 H8861-AA trilink with a BN38C cable.

Figure 2–4: Radially Connected TruCluster Configuration Using Two Member Systems with KZPBA-CBs, a DS-DWZZH-03, and HSZ70s

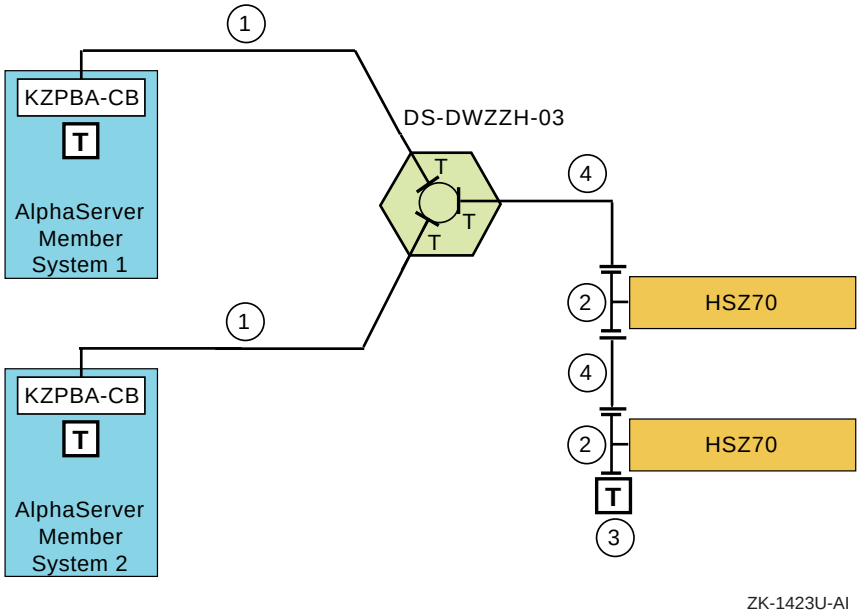


Figure 2–5: Radially Connected TruCluster Configuration Using Four Member Systems with KZPBA-CBs, a DS-DWZZH-05, and HSZ70s

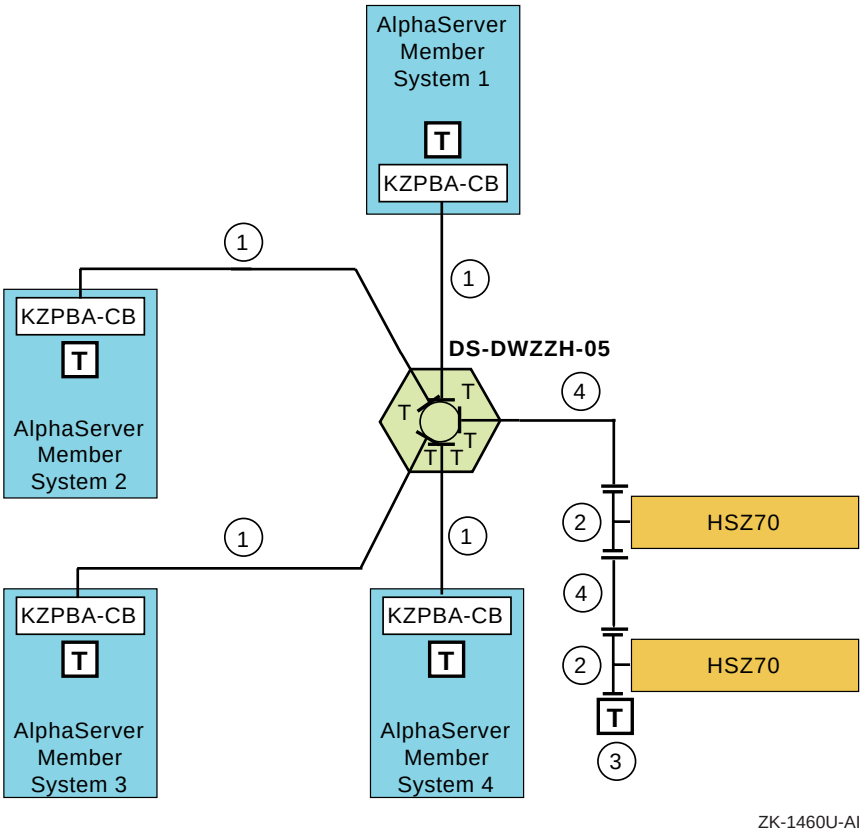


Table 2–4 shows the components used to create the cluster shown in Figure 2–4 and Figure 2–5.

Table 2–4: Hardware Components Used in the Configuration Shown in Figures 2-4 and 2-5

Callout Number	Description
1	BN38C cable[a]
2	H8861-AA VHDCI trilink connector
3	H8863-AA VHDCI terminator
4	BN37A cable[b]

[a]The maximum length of the SCSI bus segment, including BN38C cable and internal device length, must not exceed 25 meters.
[b]The maximum length of the SCSI bus segment, including the combined length of the BN37A cables and internal device length, must not exceed 25 meters.

2.2.8.2 Connecting an Externally Terminated KZPBA-CB to Shared Storage

The following sections discuss how to configure cluster systems using externally terminated KZPBA-CB UltraSCSI host adapters and a DS-BA356 UltraSCSI storage shelf, or the HSZ50 and HSZ70 RAID array controllers.

Note

The only RAID array controllers supported for use with the KZPBA-CB are the HSZ50 and HSZ70.

Also discussed are cluster configurations using a DS-DWZZH-03 UltraSCSI hub and externally terminated KZPBA-CBs in a four-member cluster.

2.2.8.2.1 Cabling a Cluster with KZPBA-CBs and a DS-BA356 UltraSCSI Storage Shelf

To prepare a cluster configuration like the one shown in Figure 2–6 or Figure 2–7 that uses KZPBA-CB UltraSCSI host adapters and a DS-BA356 UltraSCSI storage shelf, follow these steps:

1. Disable the DS-BA356 differential termination. Ensure that the personality module (DS-BA35X-DA) SCSI bus termination switches (switch pack 4) S4-1 and S4-2 are set to ON (see Figure 2–8).

   Note

   S4-3 and S4-4 are not used on the DS-BA35X-DA.

2. Enable the device position in the DS-BA356 to determine the SCSI ID. Ensure that all personality module SCSI bus address switches (switch pack 3) are set to OFF (see Figure 2–8).
3. Ensure that the BA35X-MJ jumper module is installed behind slot 6 (see Figure 2–9).
4. Install an H8861-AA VHDCI trilink on personality module connector JA1.
5. Cable and terminate the UltraSCSI bus as follows:
   - For a configuration like the one shown in Figure 2–6 with the DS-BA356 at the end of the shared SCSI bus, follow these steps:
     – Install an H8863-AA terminator on one side of the H8861-AA trilink.

- Install a BN38C cable (an HD68 to a VHDCI) between the closest BN21W-0B Y cable and the H8861-AA trilink.
- Connect two BN21W-0B Y cables from different systems with a BN21K or BN21L cable.
- Terminate the other end of the shared SCSI bus by installing an H879-AA terminator on the BN21W-0B with an open connector.

• For a configuration like the one shown in Figure 2–7 with the Ultra DS-BA356 in the middle of the shared SCSI bus, follow these steps:

- Install BN38C cables (HD68 to VHDCI) between the H8861-AA trilink and adjacent BN21W-0B Y cables.
- Terminate both ends of the shared SCSI bus by installing an H879-AA terminator on the open connector on the BN21W-0B Y cables at both ends of the bus.

Figure 2–6: Two Member Systems with KZPBA-CBs and a DS-BA356 UltraSCSI Storage Shelf

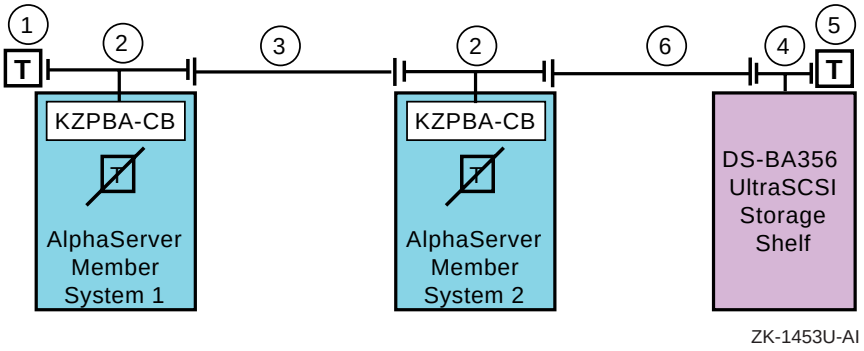


Table 2–5 shows the components used to create the cluster shown in Figure 2–6.

Table 2–5: Hardware Components Used in the Configuration Shown in Figure 2–6

Callout Number	Description
1	H879-AA HD68 terminator
2	BN21W-0B Y cable
3	BN21K or BN21L cable[a]
4	H8861-AA VHDCI trilink connector

Table 2–5: Hardware Components Used in the Configuration Shown in Figure 2–6 (cont.)

Callout Number	Description
5	H8863-AA VHDCI terminator
6	BN38C cable[a]

[a]The maximum combined length of the SCSI bus segment with the BN21K (or BN21L) and BN38C cables is 25 meters.

Figure 2–7: Two Member Systems with KZPBA-CBs and a DS-BA356 UltraSCSI Storage Shelf in the Middle of the Shared SCSI Bus

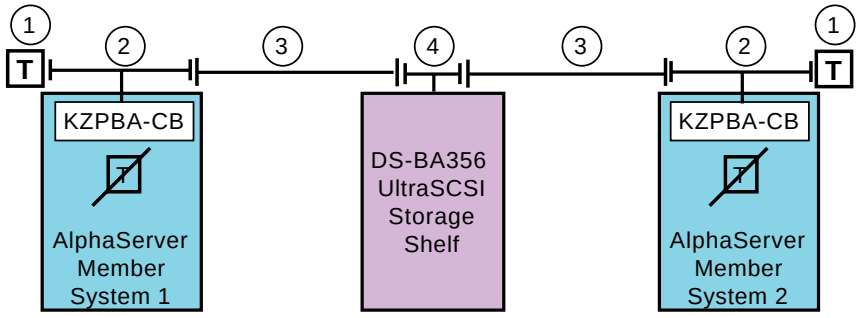


Table 2–6 shows the components used to create the cluster shown in Figure 2–7.

Table 2–6: Hardware Components Used in the Configuration Shown in Figure 2–7

Callout Number	Description
1	H879-AA HD68 terminator
2	BN21W-0B Y cable
3	BN38C cable[a]
4	H8861-AA VHDCI trilink connector

[a]The maximum combined length of the SCSI bus segment, including BN38C cables and devices, is 25 meters.

Figure 2–8: DS-BA35X-DA Personality Module Switches

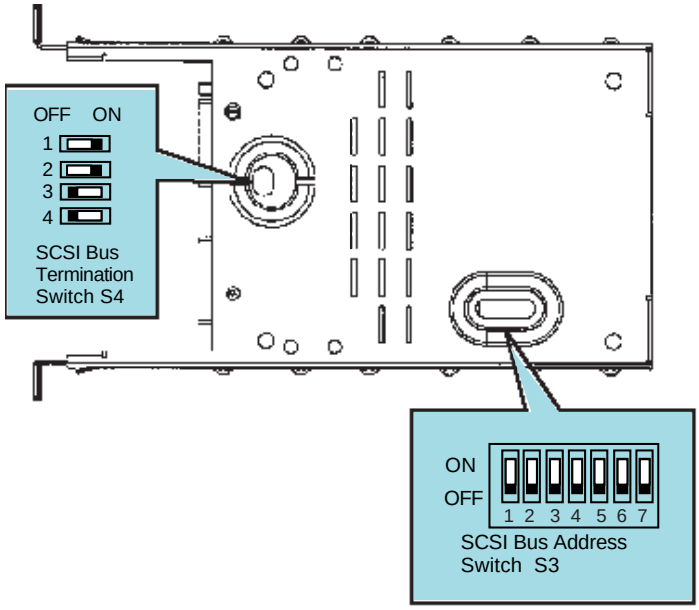
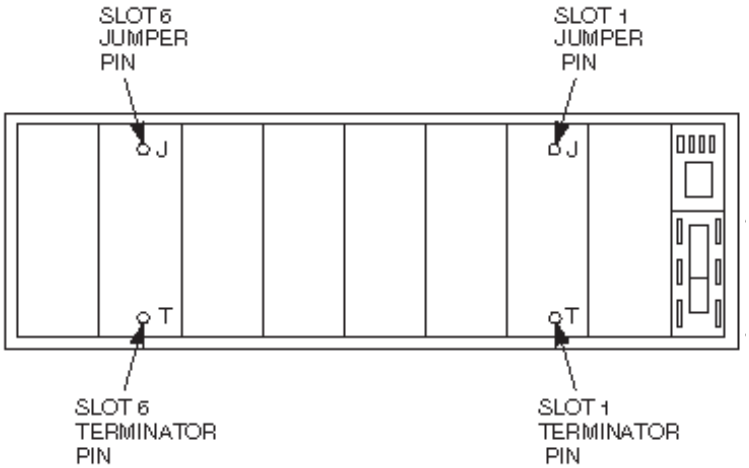


Figure 2–9: DS-BA356 Jumper and Terminator Module Identification Pins



2.2.8.2.2 Cabling an Externally Terminated Cluster with KZPBA-CBs and HSZ50s

To prepare a cluster configuration like the one shown in Figure 2–10 that uses KZPBA-CB UltraSCSI host adapters and HSZ50 RAID array controllers, follow these steps:

1. Attach an H885-AA trilink connector to each HSZ50 RAID array controller SCSI bus input connector.
2. Attach an H879-AA terminator to the H885-AA connector that will be on one end of the shared SCSI bus. Attach another H879-AA terminator to the BN21W-0B Y cable of the member system that will be on the other end of the shared SCSI bus (member system 1 in Figure 2–10).
3. Connect the BN21W-0B Y cables of the member systems with a BN21K or BN21L cable.
4. If there are two HSZ50s, connect them together by installing a BN21K or BN21L cable on each of the HSZ50 H885-AA trilink connectors.
5. Connect a BN21K or BN21L cable between the open BN21W-0B connector on one member system to the open HSZ50 H885-AA trilink connector.

Figure 2–10 shows an example configuration with two member systems with KZPBA-CB UltraSCSI host adapters and two HSZ50 RAID array controllers.

Figure 2–10: Two Member Systems with KZPBA-CBs and Two HSZ50s

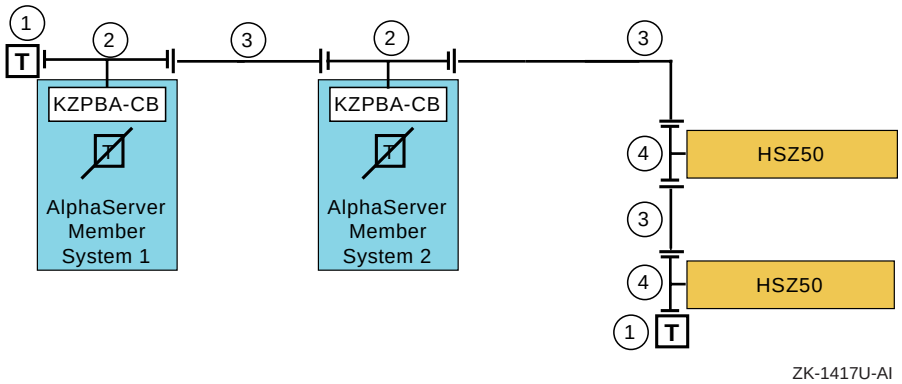


Table 2–7 shows the components used to create the cluster shown in Figure 2–10.

Table 2–7: Hardware Components Used in the Configuration Shown in Figure 2–10

Callout Number	Description
1	H879-AA HD68 terminator
2	BN21W-0B Y cable
3	BN21K or BN21L cable[a]
4	H885-AA HD68 trilink connector

[a]The maximum length of the SCSI bus segment, including BN21K (or BN21L) cables and the devices, must not exceed 25 meters.

2.2.8.2.3 Cabling an Externally Terminated Cluster with KZPBA-CBs and HSZ70s

To prepare the cluster configuration like the one shown in Figure 2–11 that uses KZPBA-CB UltraSCSI adapters and HSZ70 RAID array controllers, follow these steps:

1. Attach an H879-AA terminator to the BN21W-0B Y cable that will be on the member system at one end of the shared SCSI bus (member system 1 in Figure 2–11).
2. Connect the BN21W-0B Y cables of the member systems with BN21K or BN21L cables.
3. Attach an H8861-AA VHDCI trilink connector to the input connector on each HSZ70 RAID array controller.
4. Attach an H8863-AA VHDCI terminator to one side of one of the H8861-AA trilink connectors. This provides termination for the storage end of the shared SCSI bus.
5. If there are two HSZ70s, connect the H8861-AA trilink connectors with a BN37A cable.
6. Connect a BN38C cable between the open BN21W-0B Y cable on one member system (member system 2 in Figure 2–11) and the H8861-AA trilink connector on the HSZ70.

Figure 2–11 shows an example configuration with two member systems with KZPBA-CB UltraSCSI host adapters and two HSZ70 RAID array controllers.

Figure 2–11: Two Member Systems with KZPBA-CBs and Two HSZ70s

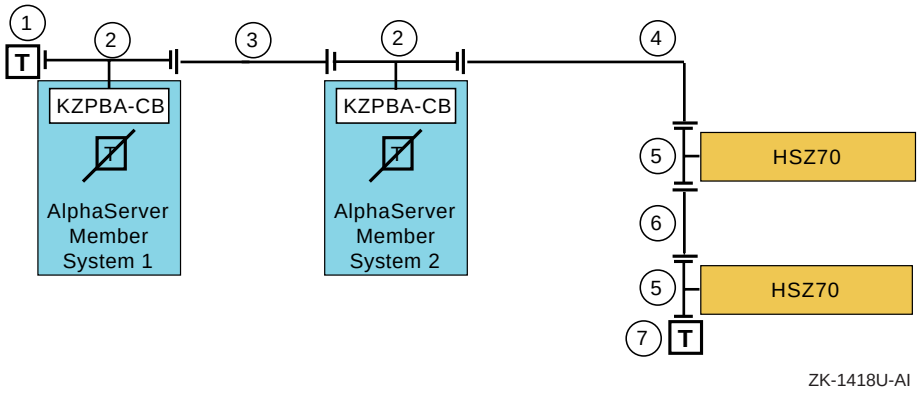


Table 2–8 shows the components used to create the cluster shown in Figure 2–11.

Table 2–8: Hardware Components Used in the Configuration Shown in Figure 2–11

Callout Number	Description
1	H879-AA HD68 terminator
2	BN21W-0B Y cable
3	BN21K or BN21L cable[a]
4	BN38C cable[a]
5	H8861-AA VHDCI trilink connector
6	BN37A cable[a]
7	H8863-AA VHDCI terminator

[a]The maximum length of the SCSI bus segment, including BN21K (or BN21L), BN38C, BN37A cables, and the devices, is 25 meters.

2.2.8.2.4 Cabling a Four-Member Cluster with KZPBA-CBs, a DS-DWZZH-03, and HSZ50s

To prepare the cluster configuration like the one shown in Figure 2–12 with four member systems with KZPBA-CB UltraSCSI adapters, a DS-DWZZH-03, and HSZ50 RAID array controllers, follow these steps:

1. Attach an H885-AA HD68 trilink connector to the input connector on each HSZ50 RAID array controller.
2. Attach an H879-AA terminator to the H885-AA connector that will be on the end of the HSZ50 shared SCSI bus segment. Attach an

H879-AA terminator to each BN21W-0B Y cable on the member system at the end of the SCSI bus segments (member systems 1 and 3 in Figure 2–12). The termination for the other end of each SCSI bus segment is in the DS-DWZZH-03.

3. Connect the BN21W-0B Y cables of the two member systems that will be on the same SCSI bus segment with a BN21K or BN21L cable (member system 1 to 2 and member system 3 to 4 in Figure 2–12).
4. If you have two HSZ50s, connect their H885-AAs together with a BN21K or BN21L cable.
5. Connect a BN38C cable between the open BN21W-0B connector on each member system (member systems 2 and 4 in Figure 2–12) and one of the DS-DWZZH-03 connectors. Connect another BN38C cable between the remaining DS-DWZZH-03 connector and the HSZ50 H885-AA.

Note

You may use external termination and Y cables with a DWZZH-03 UltraSCSI hub to achieve a 4-member cluster configuration, but you may not use external termination and Y cables with a DWZZH-05 UltraSCSI hub.

Figure 2–12 shows an example configuration with four member systems with KZPBA-CB UltraSCSI host adapters, a DS-DWZZH-03 UltraSCSI hub, and two HSZ50 RAID array controllers.

Figure 2–12: Four Member Systems with KZPBA-CBs, a DS-DWZZH-03 UltraSCSI Hub, and Two HSZ50s

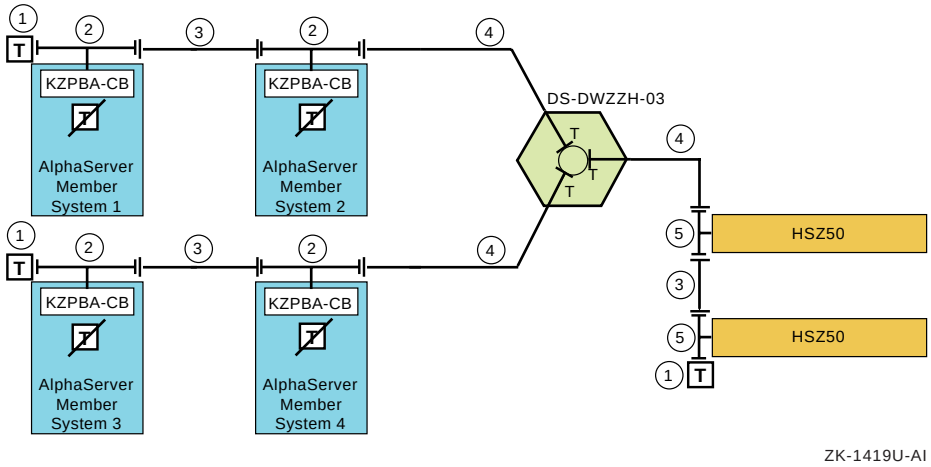


Table 2–9 shows the components used to create the cluster shown in Figure 2–12.

Table 2–9: Hardware Components Used in the Configuration Shown in Figure 2–12

Callout Number	Description
1	H879-AA HD68 terminator
2	BN21W-0B Y cable
3	BN21K or BN21L cable[a]
4	BN38C cable[a]
5	H885-AA HD68 trilink connector

[a]The maximum length of a SCSI bus segment, including the combined length of BN21K (BN21L) and BN38C cables and internal device length, must not exceed 25 meters.

2.2.8.2.5 Cabling a Four-Member Cluster with a KZPBA-CB, DS-DWZZH-03, and an HSZ70

To prepare a cluster configuration with four member systems like the one shown in Figure 2–13 that uses KZPBA-CB UltraSCSI adapters, a DS-DWZZH-03 UltraSCSI hub, and HSZ70 RAID array controllers, follow these steps:

1. Attach an H879-AA terminator to the BN21W-0B Y cable that will be on the end of each shared SCSI bus segment (member systems 1 and 3 in Figure 2–13).

2. Connect the BN21W-0B Y cables of the member systems with a BN21K or BN21L cable (member system 1 to 2 and member system 3 to 4).
3. Connect a BN38C cable between the open BN21W-0B connector on one member system in each SCSI bus segment (member systems 2 and 4) to a DS-DWZZH-03 connector. One end of each SCSI bus segment is terminated with an H879-AA. The other end of each SCSI bus segment is terminated at the DS-DWZZH-03.
4. Attach an H8861-AA VHDCI trilink connector to the input connector on each HSZ70 RAID array controller.
5. Attach an H8863-AA VHDCI terminator to one side of the H8861-AA trilink connector that will be on the end of the SCSI bus segment.
6. If there are two HSZ70s, connect the H8861-AA trilink connectors with a BN37A cable.
7. Connect the open DS-DWZZH-03 connector to the open H8861-AA trilink connector on the HSZ70, with a BN37A cable.

Note

You may use external termination and Y cables with a DWZZH-03 UltraSCSI hub to achieve a 4-member cluster configuration, but you may not use external termination and Y cables with a DWZZH-05 UltraSCSI hub.

Figure 2–13 shows an example configuration with four member systems with KZPBA-CB UltraSCSI adapters, a DS-DWZZH-03 UltraSCSI hub, and two HSZ70 RAID array controllers.

Figure 2–13: Four Member Systems with KZPBA-CBs, a DS-DWZZH-03 UltraSCSI Hub, and Two HSZ70s

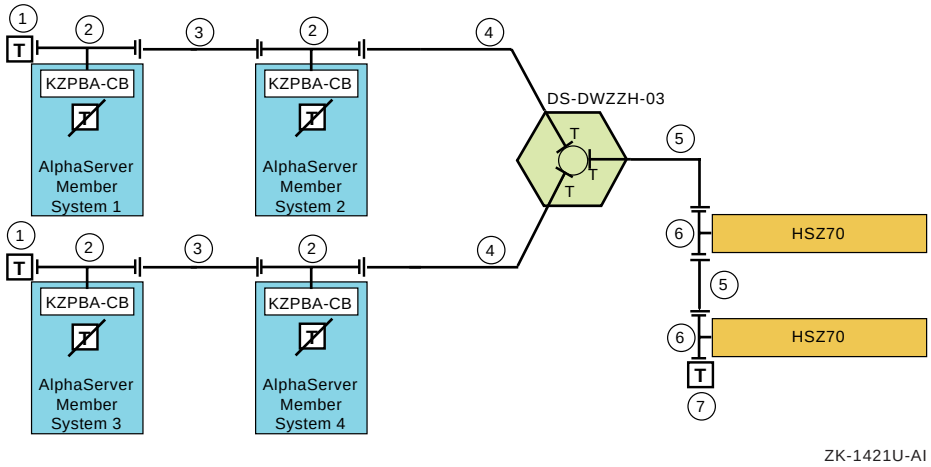


Table 2–10 shows the components used to create the cluster shown in Figure 2–13.

Table 2–10: Hardware Components Used in the Configuration Shown in Figure 2–13

Callout Number	Description
1	H879-AA HD68 terminator
2	BN21W-0B Y cable
3	BN21K or BN21L cable[a]
4	BN38C cable[a]
5	BN37A cable[b]
6	H8861-AA VHDCI trilink connector
7	H8863-AA VHDCI terminator

[a]The maximum length of the SCSI bus segment, including the combined length of the BN21K (BN21L) cable, BN38C cable, and devices, is 25 meters.
[b]The maximum length of the SCSI bus segment, including the combined length of the BN37A cables and the devices, is 25 meters.

3

Replacing a KZPSA-BB with a KZPBA-CB in an Operational Cluster

You may want to replace KZPSA-BBs on a shared SCSI bus in an existing cluster with KZPBA-CBs to gain the extra speed provided by the UltraSCSI devices.

The SCSI bus connectors on the KZPSA-BB and KZPBA-CB are both HD68 connectors, so you can replace a KZPSA-BB with a KZPBA-CB without having to change any of the existing cluster cabling. However, the system on which the replacement will take place will have to be removed from the cluster, both as a member system and from the shared SCSI buses, and turned off.

Note

If all the shared SCSI buses attached to the system having a KZPSA-BB replaced are not properly terminated (either using Y cables or trilinks and external termination, or a DWZZH as appropriate for the configuration), you will not be able to disconnect the SCSI cable from the KZPSA-BB being replaced and retain proper SCSI bus termination. Therefore, you will not be able to execute this procedure on one system and maintain cluster operation.

Follow the steps in Table 3–1 to replace KZPSA-BBs with KZPBA-CBs and maintain cluster operation. You will replace the KZPSA-BBs in one member system at a time. Therefore, you must repeat this procedure for each system in the cluster that has KZPSA-BBs you wish to replace with KZPBA-CBs.

Table 3–1: Installing the KZPBA-CB

Step	Action	Refer to:
1	Use the ASE manager (`asemgr`) to determine which services are being provided by the system that will be shut down to have its KZPSA-BBs replaced. Relocate all services from this member system to another system in the same ASE.	TruCluster Software Products *Administration*
2	Use the ASE manager to delete the member system having its KZPSA-BBs replaced from the cluster.	TruCluster Software Products *Administration*
3	On the system having its KZPSA-BBs replaced, log in as the root user and execute the `shutdown -h` utility to halt the system.	
4	Use the `show config`, `show device`, `show kzpsa*`, `show pk*`, or `show isp*` console commands as appropriate to determine the SCSI IDs of the KZPSA-BBs to be replaced. Record the SCSI IDs.	Section 2.2.6, Section 2.2.7, Example 2–3 through Example 2–13
5	Turn off the system.	
6	Disconnect the Y cable or the BN38C cable from the KZPSA-BB to be removed.	
7	Remove the KZPSA-BB.	
8	Install the KZPBA-CB. Ensure that the system restrictions are adhered to.	Section 1.2, Section 2.2.2, and Table 2–2, or Section 2.2.1, and Table 2–1, and *KZPBA-CB PCI-to-Ultra SCSI Differential Host Adapter User's Guide*
9	Install the Y cable or BN38C cable you removed from the KZPSA-BB on the KZPBA-CB you just installed.	
10	Repeat steps 6 - 9 for each KZPSA-BB to be replaced with a KZPBA-CB.	
11	Turn on the system.	
12	Set each KZPBA-CB SCSI ID to the same SCSI ID as the KZPSA you removed and determined in step 4.	Section 2.2.7, Example 2–11 through Example 2–13
13	Boot `/genvmunix`.	

Table 3–1: Installing the KZPBA-CB (cont.)

Step	Action	Refer to:

14	Build a new kernel (`doconfig`). During the kernel build, the `sizer` utility is called by `doconfig` to create a new system configuration file. When the `ase_fix_config` utility is executed, you can use the `Reapply previous assignments` option to configure the shared SCSI buses.
	
	Save `/vmunix` in case you have problems booting the new operating system:
	
	`cp /vmunix /vmunix.old`
	
	Copy the new kernel to `/vmunix`:
	
	`cp /usr/sys/HOSTNAME/vmunix /vmunix`
		Example 3–1

15	Boot the new kernel (`shutdown -r now`).	
16	Run the ASE manager on a member system in the same ASE to add the system with the new KZPBA-CB to the cluster. Use the ASE manager to relocate services to the system just added to the cluster, if desired.	
17	Repeat steps 1 - 16 for all other systems in the ASE.	

When the `ase_fix_config` utility is run, you can request that the previous SCSI bus assignment be used as shown in Example 3–1. The `ase_fix_config` checks the `/var/ase/config/config.changes` file to determine if the SCSI configuration was changed. You can view this file by selecting `Show previous assignments` from the menu.

Example 3–1: Renumbering Shared SCSI Buses by Reapplying the Old Configuration

```
                ASE I/O Bus Renumbering Tool

It appears that there are no changes in the scsi configuration
since this tool (ase_fix_config) was last run.  Do you want to
change or view the scsi configuration anyway? [n]: y

                Shared I/O Bus Selection Menu

At least one shared I/O bus must exist in the ASE.  These I/O
buses must be connected to all ASE members and named the same
on each.  Controllers that are not supported by ASE are not
given as options.  NOTE: Internal I/O controllers are not
supported by ASE and should not be selected.
```

Example 3–1: Renumbering Shared SCSI Buses by Reapplying the Old Configuration (cont.)

```
Select the controllers that define the shared ASE I/O buses.

        Name    Controller      Slot    Bus     Slot
     )  scsi0   psiop0          0       pci1    1
     )  scsi1   psiop1          0       pci1    2
    2)  scsi2   isp0            0       pci1    3
    3)  scsi3   isp1            0       pci1    4
    4)  scsi4   isp2            0       pci1    5
    5)  scsi5   pza1            0       pci0    4


    q)  Quit without making changes

Enter your choices (comma or space separated): 2 3 4 5

        scsi2 isp0 0 pci1 3
        scsi3 isp1 0 pci1 4
        scsi4 isp2 0 pci1 5
        scsi5 pza1 0 pci0 4
Is the above choice correct (y|n)? [y]:  Return

                I/O Controller Name Specification Menu

All controllers connected to an I/O bus must be named the same
on all ASE members.  Enter the controller names for all shared
ASE I/O buses by assigning them one at a time or all at once
with the below options.


    Name      New Name    Controller    Slot    Bus     Slot
2)  scsi2     scsi2       isp0          0       pci1    3
3)  scsi3     scsi3       isp1          0       pci1    4
4)  scsi4     scsi4       isp2          0       pci1    5
5)  scsi5     scsi5       pza1          0       pci0    4

    f)  Assign buses starting at a given number
    v)  View nonshared controllers
    s)  Show previous assignments
    r)  Reapply previous assignments
    q)  Quit without making any changes
    x)  Exit (done with modifications)

Enter your choice [f]: s

The last time this tool was run, the following name
changes were made:
```

Example 3–1: Renumbering Shared SCSI Buses by Reapplying the Old Configuration (cont.)

```
        Old        New
        scsi2   -> scsi6
        scsi3   -> scsi7
        scsi4   -> scsi8
        scsi5   -> scsi9

                I/O Controller Name Specification Menu

All controllers connected to an I/O bus must be named the same
on all ASE members.  Enter the controller names for all shared
ASE I/O buses by assigning them one at a time or all at once
with the below options.


    Name      New Name    Controller    Slot    Bus     Slot
2)  scsi2     scsi2       isp0          0       pci1    3
3)  scsi3     scsi3       isp1          0       pci1    4
4)  scsi4     scsi4       isp2          0       pci1    5
5)  scsi5     scsi5       pza1          0       pci0    4

    f)  Assign buses starting at a given number
    v)  View nonshared controllers
    s)  Show previous assignments
    r)  Reapply previous assignments
    q)  Quit without making any changes
    x)  Exit (done with modifications)

Enter your choice [f]: r


                I/O Controller Name Specification Menu

All controllers connected to an I/O bus must be named the same
on all ASE members.  Enter the controller names for all shared
ASE I/O buses by assigning them one at a time or all at once
with the below options.

    Name      New Name    Controller    Slot    Bus     Slot
2)  scsi2     scsi6       isp0          0       pci1    3
3)  scsi3     scsi7       isp1          0       pci1    4
4)  scsi4     scsi8       isp2          0       pci1    5
5)  scsi5     scsi9       pza1          0       pci0    4

    f)  Assign buses starting at a given number
    v)  View nonshared controllers
```

Example 3–1: Renumbering Shared SCSI Buses by Reapplying the Old Configuration (cont.)

```
    s)  Show previous assignments
    r)  Reapply previous assignments
    q)  Quit without making any changes
    x)  Exit (done with modifications)

Enter your choice [x]:  Return
```

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